WELDING PROCEDURE SPECIFICATION

WPS - 1000-1 **REV. NO.:** 1 **DATE:** 7/15/2005 ****APPLICABILITY****

WELDING PROCESS: SMAW- **and** SMAW- **ASME:** X **AWS:** X **OTHER:**

SUPPORTING PQR: P-WS-238 Z-WS-5B-F P-WS-1-1 P-WS-2-1 P-WS-31-1
P-WS-3-1 Z-WS-4C-V Z-WS-5-H, V, O Z-WS-5B-F Z-WS-5C P-WS-159-1

JOINT: This WPS shall be used in conjunction with the General Welding Standards (GWS) and Welding Fabrication Procedure (WFP) sections and criteria for joint details, repairs, NDE, inspection etc.

Weld Joint Type: Butt/fillet		**Class:**	Full/partial penetration
See GWS 1-06 and WFP's for joint details		**Preparation:**	Thermal/Mechanical
Root Opening: 1/16"- 1/8"		**Backing:**	With/without single sided
Backgrind root: On double sided joints		**Backing Mat.:**	CS Strap/ring when used
Bkgrd Method: Arc gouge/grind/file		**GTAW Flux:** N/A	**Backing Retainer:** N/A

FILLER METALS **Class:** *E60xx **and** E70xx

A No: 1 **SFA Class:** 5.1 **and** 5.1 **F No:** 3 **and** 4 **Size:** 3/32 1/8 5/32 3/16

Insert: N/A **Insert Desc.:** N/A **Weld Metal Thickness Ranges:**

Flux: Type: N/A **Size:** N/A

AWS Root Pass:	0.125 **thru**	1.5
AWS Balance:	0.125 **thru**	8.000
ASME Root Pass:	0.062 **thru**	2
ASME Balance:	0.062 **thru**	8.000

Filler Metal Note: Low hydrogen electrodes limited to V/UP only. No bead or pass shall be greater than 1/2"in thichness.

BASE MATERIAL **P No.** 1 **Gr No.** 1 **to: P No.** 1 **Gr No.** 2

Spec. Mild Steel **Grade:** All **to: Spec.** Mild Steel **Grade:** All

Qualified Pipe Dia. Range: ≥ **AWS:** 4 **ASME:** 0.125

Qualified Thickness Range: **AWS:** 0.125 **thru** 8.000 **ASME:** 0.062 **thru** 8.000

QUALIFIED POSITIONS: **AWS:** All-pl/pipe **ASME:** All pl/pipe **Vert. Prog.:** *V-DN/UP

Preheat Min. Temp.:	70 **°F**	**GAS: Shielding:**	N/A	**or**	N/A
Interpass Max. Temp.:	500 **°F**	**Gas Composition:**	0 / 0 / 0 **%**		0 / 0 / 0 **%**
Preheat Maintenance:	70 **°F**	**Gas Flow Rate cfh:**	0 **to** 0		0 **to** 0
PWHT: Time @ °F Temp.	N/A	**Backing Gas/Comp:**	N/A		0 **%**
Temp. Range:	N/A **°F**	**Backing Gas Flow cfh:**	0 **to** 0		
to	N/A **°F**	**Trailing Gas/Comp:**	N/A		0 **%**

APPROVAL: Signatures on file at ENG **DATE:** 7/15/2005

WPS NO: 1000-1

WELDING CHARACTERISTICS:

Current: DCEP **and** DCEP **Tungsten Type:** N/A **Transfer Mode:** N/A

Ranges: Amps 70 **to** 240 **Tungsten Dia.:** **Pulsing Cycle:** 0 **to** 0

Volts **to** **Background Current:** 0

Fuel Gas: N/A **Flame:** N/A **Braze temp. °F** N/A **to** N/A

WELDING TECHNIQUE: **For fabrication specific requirements sucg as fittup, cleaning, grinding, PWHT and inspection criteria refer to Volume 2, Welding Fabrication**

Technique: Manual **Cleaning Method:** Wire brush/file/grind/chip

Single Pass or Multi Pass: M **Stringer or Weave bead (S/W):** S/W **Oscillation:** N/A

GMAW Gun Angle °: 0 **to** 0 **Forehand or Backhand for GMAW (F/B):** N/A

GMAW/FCAW Tube to work distance: N/A

Maximum K/J Heat Input: N/A **Travel speed:** Variable **Gas Cup Size:** N/A

PROCEDURE QUALIFIED FOR:

Charpy "V" Notch: Y **Nil-Ductil Transition Temperature:** N/A **Dynamic Tear:** N/A

Comments: (1) Peening is not allowed. (2) No bead or pass shall be greater than 1/2"in thichness. (3) Actual basemetal and weld metal thicknesses qualified may be further limited by the specified fabrication code. (4) *V up or down for E -6/7010 only.

Weld Layer	Manual Process	Filler Metals	Size	Amp Range	Volt Range	Travel/ipm	Nozzel Angle	Other
1	SMAW-	*E60xx	3/32	70 **to** 95	**to**	**to**	0 **to** 0	
2	SMAW-	E70xx	1/8	125 **to** 160	**to**	**to**		
3	SMAW-	E70xx	5/32	140 **to** 205	**to**	**to**		
4	SMAW-	E70xx	3/16	170 **to** 240	**to**	**to**		
5								
6								

REM. * Weld layers are representative only - actual number of passes and layer sequence may vary due to variations in joint design, thickness and fitup.

Use of LANL Welding Procedures and Welder Qualifications for non-LANL work shall be at the sole risk and responsibility of the Subcontractor, and the Subcontractor shall indemnify and save LANL and the Government harmless from any and all claims, demands, actions or causes of action, and for any expense or loss by reason of Subcontractor's and their employees posession and use of LANL procedures and qualifications.